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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Field of the Invention] This invention relates to the technique which incorporates and delivers an animation from a video camera in more detail about the control approach of image pick-up equipment and an image distribution system, the control device of image pick-up equipment, and an image distribution system.

[0002]

[Description of the Prior Art] Conventionally, in the system which can observe the image of a video camera from the many points of a remote place, there are some which it not only observes a camera image, but made possible remote control of whenever [pantilt angle / of a camera], or a zoom scale factor. For example, the WWW (World Wide Web) server on the Internet is led as indicated by JP,10-42279,A, It not only delivers the real-time image photoed from the camera to one or more PCs similarly connected to the Internet, but it connects the camera in which computer control is possible, and a system which also allows control of the camera by PC is proposed.

[0003] In a video-delivery-through-the-Internet system as for which image delivery is made to two or more PCs (client) in which such camera control is possible, it came considering offering the image of real time as the first purpose. Therefore, the image in the specific time of day of a certain past cannot usually be seen later. For this reason, in order to see the past image afterwards, it is necessary for it to be necessary to photo an image, while an operator operates a camera beforehand, and to change this into a predetermined format, and to record on the secondary storage on a WWW server. Thus, it enabled it to see the recorded image through the Internet later using a web browser.

[0004]

[The technical problem which it is going to solve] Therefore, since activity of changing the data of the image which carried out video photography and which was photoed while the operator did camera actuation into the compression digital data of the form which can be perused by the Internet, and putting on a WWW server for the material image creation for providing in order to offer the image of the past when the WWW server was recorded and to carry out image dispatch is required, a camera operator's activity skill is not only needed, but time and effort was this thing.

[0005] This invention is made in view of the above-mentioned trouble, and does not need a camera operator's **** skill, but it aims at saving a desired image as image data of the format which can be perused by the Internet quickly and certainly, without applying time and effort.

[0006] Moreover, it sets it as the further purpose to notify initiation/end time of camera actuation certainly to those who wish the operator of a camera, or actuation.

[0007] Moreover, it sets it as the further purpose to make it what is éasy to peruse image data.

[0008]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the control approach of the image pick-up equipment of this invention in the image distribution system which distributes the image picturized by image pick-up equipment to a terminal unit has the image pick-up process which

performs a predetermined time image pick-up with said image pick-up equipment at the time of day set up beforehand, and the preservation process which saves the image picturized at said image pick-up process.

[0009] Moreover, the camera server equipment which controls image pick-up equipment and said image pick-up equipment in this invention, The control approach of the image distribution system containing the storage which processes and memorizes the image obtained from said image pick-up equipment, and the terminal unit which peruses the image picturized by said image pick-up equipment The image pick-up process which controls said image pick-up equipment by said camera server equipment, and performs a predetermined time image pick-up at the time of day set up beforehand, The preservation process which saves the image picturized at said image pick-up process in said camera server equipment, It has the transfer process which transmits the image saved at said preservation process to said storage at predetermined time of day, and the file translation storage process of changing and saving the image transmitted at said transfer process at the file format which can peruse said terminal unit.

[0010] Furthermore, the control device of the image pick-up equipment of this invention has a data-hold means to hold the control data for controlling image pick-up equipment, the control means, to which control said image pick-up equipment based on the control data held for said data-hold means to the time of day set up beforehand, and a predetermined time image pick-up is made to carry out, and an image preservation means to save the image picturized with said image pick-up equipment.

[0011] Moreover, the image distribution system of this invention has said control unit, said image pick-up equipment, the storage that processes and memorizes the image obtained from said image pick-up equipment, and the terminal unit which peruses the image picturized by said image pick-up equipment.

[0012] Moreover, preferably, said control unit has a transfer means to transmit the image saved for said image preservation means to said storage at predetermined time of day, and said image distribution equipment changes and saves the image transmitted by said transfer means at the file format which can peruse said terminal unit.

[0013] According to the suitable uniform voice of this invention, photography by said image pick-up equipment is performed based on the control data set up beforehand.

[0014] Moreover, preferably, said control data contains any one, even if there are few zoom values of image pick-up equipment, pan control values, and tilt control values.

[0015] Moreover, according to the suitable uniform voice of this invention, the time of day which starts said image pick-up, and the time amount to photo make time of day and time amount 1 set, and two or more sets are set up.

[0016] Furthermore, according to the suitable uniform voice of this invention, it has further the control acquisition process of acquiring the right which controls said image pick-up equipment, and said control acquisition process is performed in advance of said image pick-up process at said time of day set up beforehand. Moreover, it has further a control acquisition means to acquire the right which controls said image pick-up equipment, and said control acquisition means acquires a right in advance of photography by said image pick-up means at said time of day set up beforehand.

[0017] Furthermore, said terminal unit can control said image pick-up equipment through said control unit, and in case the right by which said control unit controls image pick-up equipment is acquired, when said terminal unit has already held the right which controls said image pick-up equipment, it makes the right concerned an invalid compulsorily.

[0018] Preferably, said control device is camera server equipment.

[0019] Moreover, said control unit, said storage, and said terminal unit are preferably connected through the network.

[0020] The unattended operation of the camera carries out by the camera-control pattern which specified as the specific time of day which was specified according to the above-mentioned configuration, file preservation carries out, and when carrying out image dispatch by transmitting to the secondary storage on the server automatically connected to the network at the time of day which specified it in order to offer the image of the recorded past, time and effort, such as the camera actuation by the operator and a transfer, can exclude by using a camera image as digital data.

[0021] Moreover, in order to attain the above-mentioned purpose, it has the decision process which judges whether the data distribution approach of this invention which distributes data to the 2nd terminal unit from the 1st terminal unit distributes data according to the access situation of the client to said 1st terminal unit, and the distribution process which distributes data to said 2nd terminal unit based on the decision result in said decision process.

[0022] Moreover, it has a decision means to judge whether the data distribution equipment of this invention which distributes data to an external terminal unit distributes data according to the access situation of the client to said data distribution equipment, and a distribution means to distribute data to said external terminal unit based on the decision result in said decision means.

[0023] According to the suitable uniform voice of this invention, at said decision process, when the client has not accessed said 1st terminal unit, it judges that distribution of data is performed, and when the client has not accessed said data distribution equipment, it is judged that said decision means performs distribution of data.

[0024] Moreover, according to another suitable uniform voice of this invention, at said decision process, when the client of a predetermined number has not accessed said 1st terminal unit, it judges that distribution of data is performed, and when the client of a predetermined number has not accessed said data distribution equipment, it is judged that said decision means performs distribution of data.

[0025] Moreover, according to the suitable uniform voice of this invention, said data distribution approach has further the receiving process which receives the access situation of the client to said 2nd terminal unit from said 2nd terminal unit, and it judges whether data are distributed according to the access situation of the client to said 2nd terminal unit obtained at the access situation and said receiving process of the client to said 1st terminal unit at said decision process. Moreover, the data distribution equipment of this invention has further a receiving means to receive the access situation of the client to said external terminal unit from said external terminal unit, and it judges whether said decision means distributes data according to the access situation of the client to said external terminal unit obtained with the access situation and said receiving means of the client to said data distribution equipment.

[0026] Moreover, according to the suitable uniform voice of this invention, at said decision process, when the client has not accessed the both sides of said 1st and 2nd terminal units, it judges that distribution of data is performed, and when the client has not accessed the both sides of said data distribution equipment and an external terminal unit, it is judged that said decision means performs distribution of data.

[0027] Moreover, according to another suitable uniform voice of this invention, at said decision process, when the client of a predetermined number has not accessed the both sides of said 1st and 2nd terminal units, it judges that distribution of data is performed, and when the client of a predetermined number has not accessed the both sides of said data distribution equipment and an external terminal unit, it is judged that said decision means performs distribution of data.

[0028] Moreover, according to the suitable uniform voice of this invention, said decision process judges at the time of day set up beforehand, and said decision means judges at the time of day set up beforehand.

[0029] Moreover, according to the suitable uniform voice of this invention, the data distributed by said distribution process or the image distribution means are image data.

[0030] Moreover, according to the suitable uniform voice of this invention, at said distribution process, data are distributed by the predetermined file transfer protocol, and said distribution means distributes data by the predetermined file transfer protocol.

[0031] In order to attain the above-mentioned purpose, moreover, the data distribution approach of this invention which distributes data to the 2nd terminal unit from the 1st terminal unit The receiving process which receives the access situation of the client to said 2nd terminal unit from said 2nd terminal unit, It has the decision process which judges whether data are transmitted according to the access situation of the client to said 2nd terminal unit received according to said receiving process, and the distribution process which distributes data to said 2nd terminal unit based on the decision result in said decision process.

[0032] Moreover, the data distribution equipment of this invention which distributes data to an external terminal unit has a decision means judge whether data transmit according to the access situation of the client to said external terminal unit received by receiving means receive the access situation of the client to said external terminal unit, and said receiving means from said external terminal unit, and a distribution means distribute data to said external terminal unit based on said decision means **** decision result.

[0033] According to the suitable uniform voice of this invention, at said decision process, when the client has not accessed said external terminal unit, it is judged that distribution of data is performed when the client has not accessed said 2nd terminal unit, and said decision means performs distribution of data.

[0034] Moreover, according to another suitable uniform voice of this invention, at said decision process, when the client of a predetermined number has not accessed said 2nd terminal unit, it judges that distribution of data is performed, and when the client of a predetermined number has not accessed said external terminal unit, it is judged that said decision means performs distribution of data.

[0035] Moreover, according to the suitable uniform voice of this invention, at said decision process, it judges further whether data are distributed according to the access situation of said 1st terminal unit, and said decision means judges further whether data are distributed according to the access situation of said data distribution equipment.

[0036] Moreover, according to the suitable uniform voice of this invention, at said decision process, when the client has not accessed the both sides of said 1st and 2nd terminal units, it judges that distribution of data is performed, and when the client has not accessed the both sides of said data distribution equipment and an external terminal unit, it is judged that said decision means performs distribution of data.

[0037] Moreover, according to another suitable uniform voice of this invention, at said decision process, when the client of a predetermined number has not accessed the both sides of said 1st and 2nd terminal units, it judges that distribution of data is performed, and with said decision means, when the client of a predetermined number has not accessed the both sides of said data distribution equipment and an external terminal unit, it is judged that distribution of data is performed.

[0038] Moreover, according to the suitable uniform voice of this invention, said decision process judges at the time of day set up beforehand, and said decision means judges at the time of day set up beforehand.

[0039] Moreover, according to the suitable uniform voice of this invention, the data distributed by said distribution process or said distribution means are image data.

[0040] Moreover, according to the suitable uniform voice of this invention, at said distribution process, data are distributed by the predetermined file transfer protocol, and said distribution means distributes data by the predetermined file transfer protocol.

[0041] In order to attain the above-mentioned purpose, moreover, the image distribution approach of this invention The image pick-up control process of performing image pick-up actuation of a camera at the time of day set up beforehand, The control grant process which carries out predetermined time grant of the control of said camera to the client which is demanding the control, When the time amount from the time of day given by said control grant process to the time of day when a camera is controlled by said image pick-up control process does not fulfill said predetermined time, It has the notice process which notifies the time amount by the time of day when a camera is controlled by said image pick-up control process from the time of day given by said control grant process to said client as time amount to which the control of said camera was given.

[0042] Moreover, the image pick-up control means which performs image pick-up actuation of a camera at the time of day when the image distribution equipment of this invention was set up beforehand, The control grant means which carries out predetermined time grant of the control of said camera to the client which is demanding the control, When the time amount from the time of day given by said control grant means to the time of day when a camera is controlled by said image pick-up control means does not fulfill said predetermined time, It has a notice means to notify the time amount by the time of day

when a camera is controlled by said image pick-up control means from the time of day given by said control grant means to said client as time amount to which the control of said camera was given.

[0043] Moreover, according to the suitable uniform voice of this invention, said image distribution approach has further the registration process which registers into a queue the client which required the control of said camera, and notifies the latency time until the control of said camera is given to said client at said notice process based on the image pick-up actuation time of day in the queue and said image pick-up control process of the client registered at said registration process.

[0044] Moreover, according to the suitable uniform voice of this invention, said image distribution equipment has further a registration means to register into a queue the client which required the control of said camera, and notifies the latency time until the control of said camera is given to said client with said notice means based on the image pick-up actuation time of day in the queue and said image pick-up control means of the client registered with said registration means.

[0045]

[Embodiment of the Invention] Hereafter, the gestalt of suitable operation of this invention is explained to a detail with reference to an accompanying drawing.

[0046] The data of the dynamic image photoed [carried out unattended operation of the camera with the camera-control pattern of the specification of some which were beforehand specified as the time of day of the specification not only offering a camera control function but specified beforehand, this invention usually delivering a real-time image to a multiple user, photoed, and] and obtained or a static image are saved temporarily, and it is automatically transmitted to a WWW server at predetermined time of day (it uploads).

[0047] Drawing 1 is drawing showing the whole photography system configuration concerning the gestalt of this operation.

[0048] For 11, as for WWW (World Wide Web) server equipment and 13, camera server equipment and 12 are [a server setting terminal unit and 14] actuation terminal units (client), respectively, and all are connected through the network 15.

[0049] camera server equipment 11 -- a pan, a tilt, and a zoom -- the operational camera 16 is connected by RS-232 etc., and camera control from the actuation terminal unit 14 is also made possible, a real-time image delivering to the actuation terminal unit 14 through a network 15 according to the demand from the actuation terminal unit 14. Moreover, camera server equipment 11 carries out unattended operation of the camera by some specific camera-control patterns beforehand specified as the specific time of day specified beforehand, saves the data of the photoed image as an image file in camera server equipment 11 temporarily, and transmits it to WWW server equipment 12 automatically. In addition, the camera 16 may be constituted in one with camera server equipment 11.

[0050] The server setting terminal unit 13 sets a camera-control pattern, camera unattended operation time of day, etc. as camera server equipment 11.

[0051] In addition, for simplification of explanation, although two or more equipments may be connected to the network 15, respectively, if which equipment and an actuation terminal unit remove the actuation terminal unit 14, they shall be respectively connected one set at a time with the gestalt of this operation. If it is digital networks with sufficient band to communicate the camera control signal mentioned later and the compressed video signal also about a network 15, such as the Internet and intranet, it is good anything. Moreover, in the gestalt of this operation, using a TCP/IP (UDP/IP) protocol as a network pro COL, when you call it the address below, suppose that an IP address is pointed out. Moreover, the IP address shall be assigned to camera server equipment 11, WWW server equipment 12, the server setting terminal unit 13, and the actuation terminal unit 14. However, it is clear this invention's not to be restricted to a TCP/IP protocol and for it to be able to apply to various well-known communications protocols.

[0052] Hereafter, the configuration of each equipment is explained.

[0053] Drawing 2 is the block diagram showing the configuration of camera server equipment 11.

[0054] Camera server equipment 11 is what controls the universal head 212 which controls whenever [pan tilt angle / of a video camera 211 and a video camera 211]. The zoom scale factor of a video

camera 211, and the camera and universal-head control section 213 which control whenever [pantilt angle / of a universal head 212], The image input section 214 which incorporates the image from a video camera 211, and the image compression zone 215 which compresses the incorporated image data, The communications control section 219 which delivers compressed image data on a network 15, Command interpretation / activation section 218 which interprets the command from the actuation terminal unit 14 received by the network 15 course, and controls each part of camera server equipment 11, The timer section 216 which performs scheduling of the time of day which uploads the image data to the WWW server 12 etc., It consists of the storage section 217 used for preservation of a camera actuation pattern or a upload schedule, and the image storage section 221 which saves an image and the whole control section 220 which controls these whole.

[0055] The camera server equipment 11 which has the above-mentioned configuration saves an image as a file according to the schedule set up by the server setting terminal unit 13, and uploads this to WWW server equipment 12 while it incorporates the image from a video camera 211 and performs delivery to the actuation terminal unit 14. Moreover, the camera control command from the actuation terminal unit 14 is received, and the zoom scale factor and universal head 212 of a video camera 211 are controlled.

[0056] In addition, since the image input section 214 is compressed with methods, such as MotionJPEG, and is sent out to the communications control section 219 in the delivery network 15 after it incorporates the NTSC video signal from a video camera 211 and carries out A/D conversion, it shall save compressed image data in the image storage section 221. In addition, as a compressed format of an image, although considered as MotionJPEG compression, this invention may not be restricted to MotionJPEG compression and what kind of compressed format, such as compressed format, such as H263 using the inter-frame correlation with more high compressibility, may be used here.

[0057] Drawing 3 is the block diagram showing the configuration of the actuation terminal unit 14.

[0058] It receives through the communications control section 31, it elongates in the image expanding section 35, and the actuation terminal unit 14 displays the compression image data delivered through a network 15 from camera server equipment 11 on the graphic display section 36. Moreover, it has come to be able to perform camera control operation by actuation of the user interface (UI) displayed on the actuation terminal unit 14. A display and control section 34 performs control of these screen display and actuation.

[0059] The bit mapped display shall be contained in the graphic display section 36, some windowing systems, such as Windows 95 which can constitute UI screen as shown in drawing 13, and X-Window, shall work in it on the actuation terminal unit 14, and a user interface screen like drawing 13 shall be displayed on it.

[0060] In drawing 13, the graphic display panel by which, as for 101, an image is displayed, and 102 are the camera control panels for camera actuation, and the pan of a camera, a tilt, and a zoom can be controlled now by operating scroll bars 1022, 1023, and 1028, respectively. Moreover, the carbon button of 1024-1027 can also perform pan tilt control of a camera.

[0061] In addition, it assumes that a video camera 211 is accessed by coincidence from two or more actuation terminal units 14, and if the user of two or more actuation terminal units 14 tries camera actuation, such as actuation of the image pick-up direction, to coincidence in that case, derangement will arise. Therefore, the concept of a control is introduced and only a user with a control can control a camera now. For example, when a certain user wishes control of a video camera 211, a control is required from camera server equipment 11, and when the client which has the control of a video camera 211 at the time does not exist, a control is granted to the user who demanded the control. A control can control a video camera 211, while being given fixed time and having the control. Moreover, when a control is required and other actuation terminal units 14 have the control of a video camera 211, a control is granted after the control of the actuation terminal unit 14 goes out. In addition, the time amount to which a control is granted, the priority of a client, etc. can be set up variously. It is indicated by JP,10-42279,A also about detailed explanation of a control.

[0062] In the gestalt of this operation, if delivery and the right of camera actuation can be acquired [the actuation initiation carbon button 1021] for a camera-control connection-request command to camera

server equipment 11 corresponding to a depression in order to require a control, a video camera 211 can be operated.

[0063] Next, actuation of an image pick-up system is explained.

[0064] Drawing 4 is a process block diagram in the gestalt of this operation. A process means the process of multitasking operating systems, such as WindowsNT and UNIX (trademark), here. In the gestalt of this operation, the multiple processes 411, 412, 421, 422, 431, 441, 451, 461, and 462 shown in drawing 4 are working. In addition, a process 423 accepts the need, and is started and ended.

[0065] With camera server equipment 11, among the processes shown in drawing 4 The camera-control server process 411 which controls the camera control instruction which the actuation client process 441 published by giving an instruction to reception and the camera control section 213, The notice process 412 of a camera condition which detects conditions, such as whenever [pan tilt angle / of a camera 16], and is notified to the actuation client process 441, The image server process 421 of managing the transmission place of a camera image, and image acquisition / transmitting process 422 of performing incorporation and transmission of a camera image, The image are recording process 423 of saving the image data which were started by the image are recording initiation instruction (drawing 12 (11)) from the upload server process 431, and were picturized with the camera 16 by file format in the image storage section 221, Starting of the image are recording process 423, directions of termination, And the upload server process 431 which uses FTP (File Transfer Protocol) and uploads the image data file saved in the image storage section 221 to WWW server equipment 12 is operating. The camera-control server process 411 holds the number of the clients which are performing the general connection request of the camera mentioned later (m) as queue information 411a.

[0066] In addition, the image data file format in the gestalt of this operation should add image are recording start time to the MotionJPEG format.

[0067] Moreover, with WWW server equipment 12, the WWW server process 461 and the FTP server process 462 are operating, and the FTP server process 462 saves at the secondary storage 463 to which reception and the WWW server process 461 manage the image data file from the upload server process 431.

[0068] Moreover, the client process 441 operates on the actuation terminal unit 14.

[0069] In addition, the transmission place list 424 is the shared memory section used for delivery of data between processes.

[0070] Moreover, in drawing 4, 432, 433, and 434 are the storage sections which save the upload place address information set up according to the setting client process 451, camera-control pattern information, and upload schedule information, respectively, and the upload server process 431 reads these setup, and they operate according to a setup.

[0071] In the upload place address information 432, it is the information about the address of the WWW server equipment 12 which is the point which uploads an image. Moreover, in the camera-control pattern information 433, in case the image to upload is accumulated, sequential migration is carried out, it is the information about a pattern and the storage time in each image pick-up direction can also set up a camera in each image pick-up direction. Moreover, the upload schedule information 434 memorizes the information about the time of day which uploads the image are recording time of day and the accumulated image of the camera based on the camera-control pattern information 433 to WWW server equipment 12.

[0072] In addition, as a packet which communicates between equipment, the thing of the format shown in drawing 12 will be generated, and it will be transmitted through a network 15. In addition, although the format used by packets, such as TCP/IP and UDP/IP, will be used strictly, drawing 12 describes only packet information required for explanation of the gestalt of operation.

[0073] First, the detail of the image server process of operating with camera server equipment 11, image acquisition / transmitting process, and an image are recording process is explained with reference to the flow chart of drawing 5 -7.

[0074] If the image server process 421 is started in step S500, initialization will be first performed at step S501. Next, after generating image acquisition / transmitting process 422 in step S502, it waits for

the event input from the actuation client process 441 thru/or the upload server process 431 at step S503. In addition, about this image acquisition transmitting process 422, it mentions later with reference to drawing 7.

[0075] If an event is inputted at step S503, the class of inputted event will be investigated. If the inputted event is a graphic display initiation demand command (drawing 12 (6)) (it is YES at step S504), the transmitting agency address of the packet contained in the graphic display initiation demand packet will be checked, the address will be added to the transmission place list 424 of images (step S505), and Ack will be returned (step S506).

[0076] Moreover, if the event inputted at step S503 is a graphic display termination demand command (drawing 12 (7)) (it is YES at step S507), the transmitting agency address of the packet contained in the graphic display termination demand packet will be checked, and the address will be deleted from the transmission place list 424 of images (step S508). In addition, the address of an image transmission place is held by list form at the image transmission place list 424.

[0077] Moreover, if the event inputted at step S503 is an image are recording initiation demand command (drawing 12 (11)) (it is YES at step S509), the image are recording process 423 will be generated by making into an argument the file name included in an image are recording initiation demand command in step S510. Therefore, whenever it receives an image are recording initiation demand command, the image are recording process 423 will be generated. This image are recording initiation demand command is published at step S804 of drawing 11 later mentioned according to the upload server process 431.

[0078] Here, actuation of the image are recording process 423 is explained with reference to drawing 6.

[0079] If the image are recording process 423 is generated and it is started at step S530 according to reception of an image are recording initiation demand command The file of the identifier specified as an argument included in an image are recording initiation demand command at step S531 is generated. Until a process is ended compulsorily (until it is set to YES at step S532) After incorporating the image from a video camera 211 as digital data (step S533) and performing image compression processing (step S534), it writes in this file (step S535). In the case of process termination, the preservation post process of a file is performed at step S536, and a process is ended.

[0080] In addition, process killing is step S511 of drawing 5, if the event inputted at step S503 is judged to be the image are recording termination demand command (drawing 12 (12)) published from the upload server process 431, it will be performed by being sent to the image are recording process 423 at step S512, will serve as YES at step S532 of drawing 6, and a process will end it.

[0081] moreover, the event inputted at step S503 -- the above -- the case where it corresponds to neither of the commands -- (-- processing corresponding to the event which received at NO) and step S513 by step S511 is performed.

[0082] Moreover, if image acquisition / transmitting process 422 is generated at step S502, the actuation shown in the flow chart of drawing 7 will be repeated. That is, if image acquisition / transmitting process 422 is started in step S520 and it is initialized at step S521, the image from a video camera 211 will be incorporated per frame at step S522, and it will compress at step S523. This compressed image data is packet-ized in the format of drawing 12 (9), and it transmits to two or more addresses in the image transmission place list 442 (step S524).

[0083] Next, with reference to drawing 8 and drawing 9, the camera-control server process 411 and the notice process 412 of a camera condition are explained.

[0084] In addition, in the gestalt of operation of this invention, there are two kinds, general control connection and privilege control connection, as a class of connection (control) for controlling a camera. General control connection is connection by the normal operation client process 441, and privilege control connection is connection by the upload server process 431. Priority is given to privilege control connection over general control connection, and general control connection of the normal operation client process 441 will be cut when privilege control connection is required.

[0085] In drawing 8, after the camera-control server process 411 is started at step S600 and initialization is completed at step S601, the notice process 412 of a camera condition is generated at step

S602, and it waits for the camera-control connection request (drawing 12 (1)) from the actuation client process 441 thru/or the upload server process 431 at step S603. According to the depression of the actuation initiation carbon button 1021 shown in drawing 13 displayed to have mentioned above on the actuation terminal unit 14, generation and transmission of the camera-control connection request (general control connection) from the client process 441 are done. In addition, in this camera-control connection-request waiting (step S603), it receives about both general control connection and a privilege control connection request.

[0086] If there is a demand of general control connection from the actuation client process 441, connection reception processing (Ack is returned) will be performed at step S604.

[0087] Here, connection reception processing of step S604 is explained to a detail using the flow chart of the camera-control server process 411 of drawing 15.

[0088] First, in step S901, when a general connection request is received, it progresses to step S902. In step S902, the upload server process 421 is accessed and the image are recording start time (ts) of the camera based on the camera-control pattern information 433 is referred to from the upload schedule information 434. Moreover, the number of the clients 14 which are demanding general control connection of a camera from queue information 411a (m) is referred to.

[0089] Next, it judges whether the client 14 which has whether m is 1 and a current control at step S903 is. If it is not 1, it will progress to step S905, if it is 1, in order to progress to step S904 and to make the conditional judgment after step S905 suit, 1 is added, and it progresses to step S905.

[0090] In step S905, it judges whether based on the queue information (m) acquired at the upload schedule information and steps S902 or S904 which were obtained in step S902, the conditions shown in the following formulas (1) are fulfilled.

[0091]

$(ts - tr) - (m - 2) \times t - ta \geq t \text{ -- (1)}$

namely, a camera [as opposed to one general control demand to the client 14 (client of the m-th queue) which newly performed the general connection request at step S905] -- it judges whether it is what may grant a camera control by the greatest controllable time amount t.

[0092] When fulfilling the conditions of a formula (1), it progresses to step S906 and notifies that the time amount which the acquisition schedule time of day of a camera control was able to grant that it is after $xt + ta$ from current (m-2) and a camera control is the maximum time amount t to the client (client of the m-th queue) which newly performed the general connection request. On the other hand, when not fulfilling the conditions of (1) type, it progresses to step S907.

[0093] In step S907, it judges whether the conditions shown in a degree type (2) are fulfilled.

[0094]

$(ts - tr) - (m - 2) \times t - ta \geq 0 \text{ -- (2)}$

When fulfilling the conditions of a formula (2), it progresses to step S908 and notifies that the time amount which the acquisition schedule time of day of a camera control was able to grant that it is after $xt + ta$ from current (m-2) and a camera control is $(ts - tr) - (m - 2) \times t - ta$ to the client 14 (client of the m-th queue) which newly performed the general connection request.

[0095] On the other hand, when not fulfilling the conditions of a formula (2), it progresses to step S909 and notifies that the time amount which the acquisition schedule time of day of a camera control was able to grant that it is after $(te - tr) + (m - n - 1) \times t$ from current and a camera control is the maximum time amount t to the client 14 (client of the m-th queue) which newly performed the general connection request. In addition, the image are recording end time of the camera based on the camera-control pattern information 433 in te and n are the number of the clients which can grant a camera control by the image are recording start time ts of a camera. n can be obtained by revaluing $(te - ts - ta) / \text{value of } t + 1$ below decimal point.

[0096] Thus, even when the image storage time of a camera based on the camera-control pattern information 433 laps to the client 14 which performed the general connection request, the information about the acquisition schedule time of day and control acquisition time amount of a camera control can be notified appropriately.

[0097] And the acquisition schedule time of day of the camera control notified from camera server equipment 11 is displayed on the display 1029 of drawing 13, and the acquisition time amount of a camera control is displayed on the display 1030 of drawing 13.

[0098] If it returns to the flow of drawing 8, it will wait for the camera control command (drawing 12 (3) - (5)) transmitted from the actuation client process 441 with the demand of a camera control (steps S605 and S607). In addition, if predetermined time (it is hereafter called "control **** time amount".) passes while a timer is set and a command has not been inputted by it (it is NO at step S607) at the same time it performs reception processing performed at step S604 (it is YES at step S605), control connection will be cut at step S606.

[0099] When a command is received at step S607 and the command is a privilege control connection request from the upload process 431 (it is YES at step S608), it progresses to step S609, and even if it is the waiting for control command, general control connection is cut, and reception processing of privilege control connection is performed. Thus, the camera-control demand from the upload server process 431 will be received until the connected privilege control connection is cut (step S607). In addition, in privilege control connection, in step S605, connection cutting processing will be performed at step S606 according to issue of the camera-control connection disconnect request (drawing 12 (2)) instead of control **** time-out.

[0100] A command is received in step S607, when it is camera control command (drawing 12 (3) - (5)) (it is YES at NO and step S610 in step S608), it progresses to step S611 and whenever [zoom scale-factor / of a video camera 211 / and pan tilt angle / of a universal head 212] is controlled through a camera and the universal-head control section 213 according to camera control command. When other commands are received, processing corresponding to NO) and the received command is performed at the (step S610).

[0101] According to the class of connection, camera control command is received from the actuation client process 441, and camera control according to a command is performed through the command interpretation section 218, and a camera and a universal-head control section 213 until control **** time amount finishes as mentioned above or a connection cutting instruction comes.

[0102] In addition, in connection cutting processing of step S606, a camera-control connection termination instruction (drawing 12 (8)) is returned to the actuation client process 441.

[0103] Moreover, as above-mentioned camera control command, there shall be the next instruction with the gestalt of this operation.

[0104] Pan include-angle variation order : P ANtheta [0105] Tilt include-angle variation order: TILphi

[0106] Zoom scale-factor variation order: ZOMalpha [0107] However, theta, phi, and alpha are the parameters showing a zoom scale factor whenever [pan include-angle and tilt angle], respectively. Otherwise in camera control command, the various **** **, such as backlight amendment, and an automatic focus, a manual focus value setup, omit explanation here.

[0108] Although the camera-control server process 411 receives the camera-control connection request from the actuation client process 441 or the upload server process 431 of the arbitration carried out similarly and camera control is realized, as shown also in drawing 4, it is not connectable with two or more actuation client processes at coincidence. Therefore, connection-oriented connection [like TCP/IP] whose the connection of this is shall be made.

[0109] Moreover, while the notice process 412 of a camera condition generated at step S602 operates, a camera condition is always checked. Namely, as shown in drawing 9, it initializes at step S621 after initiation of processing by step S620. The condition of cameras, such as a zoom scale factor (it considers as = (p, t, z)), is asked to a camera and the universal-head control section 213 whenever [pantilt angle / of a camera current at step S622]. At step S623 the actuation client process 441 of having transmitted the image -- information on the asked camera condition is made into the packet of the format of drawing 12 (9), and it transmits to all.

[0110] Next, actuation of the actuation client process 441 is explained with reference to drawing 10.

[0111] Although a process is started at step S700, if the address (it considers as "ADDR_C" an IP address and here) of the camera server equipment 11 to connect is specified and started at the time of

process starting, it will transmit after initialization at step S701, and a graphic display initiation demand (drawing 12 (6)) will be transmitted to the camera server equipment of address ADDR_C at step S702. In addition, a packet format is (6) of drawing 12 .

[0112] Here, if Ack does not come on the contrary from the camera server equipment 11 of ADDR_C (it is NO at step S703), since it is the abnormalities in actuation -- the address is wrong -- it progresses to step S704 and the actuation client process 441 is ended. Moreover, since it will be a display success if Ack comes on the contrary (it is YES at step S703), it progresses to step S705 and waits for the various packets from [from an event, i.e., a user,] the input by actuation or the camera server equipment 11 of a user interface.

[0113] If an event is inputted at step S705, it will progress to step S706. When the inputted event is the depression of the actuation initiation carbon button 1021 by the user input, it is set to YES at step S706, and if it checks with the control flag 442 which is memorized [whether it is the condition that the client concerned has already started camera control, and] by the storage section 329 of client equipment and which is shown in drawing 14 and is already controlling by step S707, it will return to step S705. If it is not [be / it] under control, a camera-control connection request (drawing 12 (1)) will be published to the camera-control server process 411 at step S708, and it will wait for authorization (Ack) at step S709. If Ack comes on the contrary here (it is YES at step S710), control connection will be materialized to the camera-control server process 411, the control flag 442 will be set at step S711, and actuation from the camera control panel 102 will be confirmed (step S712). As mentioned above, the information about camera-control start time (control acquisition time of day) and the acquisition time amount of a control is included in Ack. In addition, the camera-control server process 411 receives a connection request only at the time of the waiting for the camera-control connection request in step S603 of drawing 8 .

Moreover, when a permission is not granted, it warns of the purport which was not permitted at NO) and step S727 by the (step S710 on the user interface of a client.

[0114] Moreover, although a camera-control connection termination demand (drawing 12 (8)) is inputted as an event from the camera-control server process 411 in step S705 after control connection is materialized and predetermined time (control **** time amount) with an effective control is completed, it is set to YES at step S713 in that case, the control flag 442 is cleared at step S714, and camera actuation from the camera control panel 102 is made into an invalid (S715).

[0115] Moreover, if the event inputted at step S705 is judged to be the camera control instruction generated corresponding to actuation of the camera control panel 102 while the actuation from the camera control panel 102 is effective (it is YES at step S716), the instruction (drawing 12 (3) - (5)) corresponding to actuation will be published to the camera-control server process 411 at step S717. Since there is no direct relation to this invention about the generation process of an instruction, it omits here.

[0116] Moreover, when the event inputted at step S705 is arrival of a packet, the class of YES) and packet is investigated at the (step S718, and after in the case of image data (drawing 12 (10)) (it is YES at step S719) reading the compression image data in image data and performing expanding processing, the display image of the graphic display panel of 101 is updated using this image frame data (step S720).

[0117] When an arrival packet is the notice of a camera condition (drawing 12 (9)), the display position of the notch of the scroll bars 1021, 1023, and 1028 which operate whenever [pan tilt angle], and a zoom scale factor in YES) and step S722 at the (step S721 is changed into a corresponding location using the parameter contained in the packet. When other client processes are carrying out camera control of this, it will have updated the information.

[0118] Moreover, to a termination demand (it is YES at step S724) of the actuation client process 441 published by actuation of a menu etc., in step S725, a graphic display termination demand (drawing 12 (7)) is published, and the actuation client process 441 is ended (step S726).

[0119] Next, actuation of the upload server process 431 is explained with reference to drawing 11 , drawing 14 , and drawing 16 . Drawing 11 is a flow chart which shows the image are recording and upload processing which are performed to the predetermined timing mentioned later. In drawing 14 , (1)

is a upload schedule table and (2) is a pattern table. Drawing 16 is a flow chart which shows the image upload processing to WWW server equipment 12 from camera server equipment 11.

[0120] A upload schedule table is a table for specifying the camera-control pattern under the timing of image are recording initiation and termination, and image are recording etc., and is set as the storage section 217 of camera server equipment 11. Each entry consists of the are recording start time which starts automatically image are recording of the image data for uploading and end time, upload time of day, a below-mentioned camera actuation pattern script ID, and an are recording image file name. The camera image picturized by end time from the are recording start time of the table shown in drawing 14 (1) is saved at the file specified by the are recording image file name. Camera control is performed in the actuation which followed the specified pattern of operation in the meantime. If upload time of day comes, this image file will be uploaded to WWW server equipment 12.

[0121] On the pattern table shown in drawing 14 (2), the pattern of operation is beforehand saved in the script format described below. The pattern script ID of operation is assigned by each pattern of operation, and it is specified on the upload schedule table of drawing 14 (1). a pattern script of operation -- the camera condition 1, the latency time 1, the camera condition 2, the latency time 2, the camera condition 3, and the latency time 3 -- it is the description ... It means that the last * returns to the beginning of a script, and repeat actuation is performed. In addition, a camera condition is expressed with zoom scale-factor) whenever [(pan include-angle and tilt angle], and the latency time is latency-time spacing until it changes into the following camera condition N+1 from the camera condition N, and is expressed with a second. For example, the pattern ID of a pattern table of actuation of 1 is as follows.

[0122] 1) (a pan include angle, whenever [tilt angle], zoom scale factor) = (20 degrees, 20 degrees, 1 time) setup [0123] 2) After 10 seconds = (a pan include angle, whenever [tilt angle], zoom scale factor) (30 degrees, 20 degrees, twice) setup [0124] 3) After 10 seconds = (a pan include angle, whenever [tilt angle], zoom scale factor) (-20 degrees, -20 degrees, 4 times) setup [0125] 4) Repeat 1-4 to after [20 seconds] 1 return and henceforth.

[0126] In the upload server process 431, the entry of are recording start time, are recording end time, and upload time of day is set as the timer section 216 among the entries of this table, and if are recording start time comes, the flow of drawing 11 will be performed.

[0127] First, if processing is started at step S800, Pattern ID will be read from a upload schedule table.

[0128] Then, pattern read from the pattern table at step S800 in step S802 The pattern script of operation corresponding to ID is read.

[0129] After reading a pattern script of operation at step S802, as step S803 already described to the camera-control server process 421, privilege control connection is made compulsorily, and the camera actuation pattern corresponding to the pattern ID read from the pattern table as mentioned above is performed in step S804. By making into an argument the file name specified as this and coincidence by the file name entry of a upload schedule table also to the image are recording process 423, an image are recording initiation demand instruction is issued (processing which serves as YES at step S509 of drawing 5 , and is shown in drawing 6 at step S510 with this instruction will be performed), and it is begun to write an image in the file which specified. And if are recording end time comes, a stop and privilege control connection will be released for activation of a camera actuation pattern by publishing a camera-control connection termination demand (drawing 12 (8)) (step S805). [0130] which publishes an image are recording termination instruction also in the image are recording process 423 at this and coincidence, and performs a file preservation post process Moreover, if the upload time of day shown in the upload schedule table of drawing 14 (1) comes, this saved file will be written in the predetermined location of the secondary storage 463 of WWW server equipment 12 using FTP (File TransferProtocol) (step S806).

[0131] Here, detailed processing of upload of the image data of the upload server process 431 in step S806 is explained using drawing 16 .

[0132] First, in step S1001, it checks whether with reference to the upload schedule table of drawing 14 (1), the time of day which uploads the image file accumulated in step S804 has come.

[0133] When upload time of day comes, it progresses to step S1002 and checks whether the actuation

terminal unit (client) 14 which has accessed the camera server equipment 11 of the upload origin of image data exists. When the accessed client 14 exists, activation of upload of image data is stood by until access to the camera server equipment 11 of a client 14 is completed so that it may judge that the network is crowded and fault may not arise in the accessed client 14. And when the client 14 which has accessed camera server equipment 11 stops being, it progresses to step S1003.

[0134] In step S1003, it is asked to the WWW server process 461 of WWW server equipment 12 whether the client 14 which has accessed WWW server equipment 12 exists. When the client 14 which has accessed WWW server equipment 12 existed and there is answerback from the WWW server process 461, activation of upload of image data is stood by so that fault may not arise in the client 14 which judged that return and a network were crowded to step S1002, and has accessed it. Moreover, also when there is no answerback, it is judged as what a certain failure has produced to the network. When the client 14 which has accessed WWW server equipment 12 did not exist and there is answerback from the WWW server process 461, it progresses to step S1004 and upload of the image data from camera server equipment 11 to WWW server equipment 12 is started.

[0135] In step S1005, when the client 14 has accessed camera server equipment 11, it progresses to step S1007, upload of the image to WWW server equipment 12 is interrupted temporarily, and it returns to step S1005 so that it may judge that the network is crowded and fault may not arise in the accessed client 14. On the other hand, when the client 14 which has accessed camera server equipment 11 is not, it progresses to step S1006.

[0136] When the notice of the purport in which the client 14 which has accessed the notice from the WWW server process 461 of WWW server equipment 12 at waiting and WWW server equipment 12 exists at step S1006 is received, it progresses to step S1007, and upload of the image to WWW server equipment 12 is interrupted temporarily, and it returns to step S1005 so that it may judge that the network is crowded and fault may not arise in the accessed client 14. When there is no notice of the purport in which the client 14 which has accessed WWW server equipment 12 from the WWW server process 461 exists on the other hand, it progresses to step S1008 and upload of the image data from camera server equipment 11 to WWW server equipment 12 is resumed (continuation).

[0137] In step S1009, when it judges whether the transfer of an image file which should be uploaded was completed and upload of an image file is completed, it progresses to step S1010 and the communication link to WWW server equipment 12 is ended. On the other hand, when upload is not completed yet, it returns to step S1005.

[0138] As explained above, when the client 14 which has accessed WWW server equipment 12 or camera server equipment 11 exists according to upload processing of the image file by the upload server process 431 in the gestalt of this operation, he interrupts upload temporarily and is trying to ease network confusion. Therefore, the effect on the client 14 by network confusion will be controlled to the minimum.

[0139] In addition, when the client 14 which has accessed either WWW server equipment 12 and camera server equipment 11 existed, it is considered as the configuration which interrupts upload of image data, but processing of drawing 16 is good also as a configuration which interrupts upload of image data, when the client 14 which has accessed the both sides of WWW server equipment 12 and camera server equipment 11 exists.

[0140] In addition, although it judged whether the client which has accessed WWW server equipment 12 would be in processing of steps S1002, S1003, S1005, and S1006 of drawing 16, even if it is the processing which judges whether a number of clients defined beforehand are, the purpose of the gestalt of this operation is attained.

[0141] With WWW server equipment 12, the FTP server process 462 shall operate so that an are recording image file can be received by FTP. Moreover, the WWW server process 461 will also operate, and an image file will be placed as a file in the file group described in the HTML format so that the image file transmitted by FTP can be seen from other WWW browsers via a network.

[0142] In addition, from the setting client process 451 of operating on the server setting terminal unit 13, it connects with the upload server process 431, and a setup of the upload schedule table to the storage

section 217 of camera server equipment 11 and a pattern table is set up.

[0143]

[Other operation gestalten] It cannot be overemphasized by the purpose of this invention supplying the storage (or record medium) which recorded the program code of the software which realizes the function of the operation gestalt mentioned above to a system or equipment, and reading and performing the program code with which the computer (or CPU and MPU) of the system or equipment was stored in the storage that it is attained. In this case, the function of the operation gestalt which the program code itself read from the storage mentioned above will be realized, and the storage which memorized that program code will constitute this invention. Moreover, it cannot be overemphasized that it is contained also when the function of the operation gestalt which performed a part or all of processing that the operating system (OS) which is working on a computer is actual, based on directions of the program code, and the function of the operation gestalt mentioned above by performing the program code which the computer read is not only realized, but was mentioned above by the processing is realized.

[0144] Furthermore, after the program code read from a storage is written in the memory with which the functional expansion unit connected to the functional expansion card inserted in the computer or a computer is equipped, it cannot be overemphasized that it is contained also when the function of the operation gestalt which performed a part or all of processing that CPU with which the functional expansion card and functional expansion unit are equipped based on directions of the program code is actual, and mentioned above by the processing is realized.

[0145] When applying this invention to the above-mentioned storage, the program code corresponding to the process and flow chart which are shown in drawing 4 thru/or drawing 11 explained previously will be stored in the storage.

[0146]

[Effect of the Invention] Unattended operation of the camera is carried out by the camera-control pattern which was specified as the specified specific time of day according to this invention as explanation was given [above-mentioned]. By transmitting to the secondary storage on the server automatically connected to the network at the time of day which carried out file preservation and specified it by using a camera image as digital data When carrying out image dispatch in order to offer the image of the recorded past, time and effort, such as camera actuation by the operator and a transfer, can be saved.

[Translation done.]

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2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing showing the whole photography system configuration concerning the gestalt of operation of this invention.

[Drawing 2] It is the block diagram showing the configuration of the camera server equipment shown in drawing 1.

[Drawing 3] It is the block diagram showing the configuration of the actuation terminal unit shown in drawing 1.

[Drawing 4] It is a process block diagram in the gestalt of operation of this invention.

[Drawing 5] It is the flow chart which shows the detail of actuation of the image server process in the gestalt of operation of this invention.

[Drawing 6] It is the flow chart which shows the detail of actuation of the image are recording process in the gestalt of operation of this invention.

[Drawing 7] It is the flow chart which shows the detail of actuation of image acquisition / transmitting process in the gestalt of operation of this invention.

[Drawing 8] It is the flow chart which shows the detail of actuation of the camera-control server process in the gestalt of operation of this invention.

[Drawing 9] It is the flow chart which shows the detail of actuation of the notice process of a camera condition in the gestalt of operation of this invention.

[Drawing 10] It is the flow chart which shows the detail of actuation of the actuation client process in the gestalt of operation of this invention.

[Drawing 11] It is the flow chart which shows the detail of actuation of the upload server process in the gestalt of operation of this invention.

[Drawing 12] It is drawing showing a packet format.

[Drawing 13] It is drawing showing an example of a user interface screen.

[Drawing 14] It is drawing showing an example of the upload schedule table in the gestalt of operation of this invention, and a pattern table.

[Drawing 15] It is the flow chart of the connection reception processing in the gestalt of operation of this invention.

[Drawing 16] It is the flow chart of the upload processing in the gestalt of operation of this invention.

[Description of Notations]

11 Camera Server Equipment

12 WWW Server Equipment

13 Server Setting Terminal Unit

14 Actuation Terminal Unit

15 Network

211 Video Camera

212 Universal Head

213 Camera and Universal-Head Control Section

214 Image Input Section
215 Image Compression Zone
216 Timer Section
217 Storage Section
218 Command Interpretation / Activation Section
219 Communications Control Section
220 Whole Control Section
221 Image Storage Section
31 Communications Control Section
34 Display and Control Section
35 Image Expanding Section
36 Graphic Display Section
101 Graphic Display Panel
102 Camera Control Panel
1021 Actuation Initiation Carbon Button
1022, 1023, 1028 Scroll bar
1024-1027 Carbon button

[Translation done.]

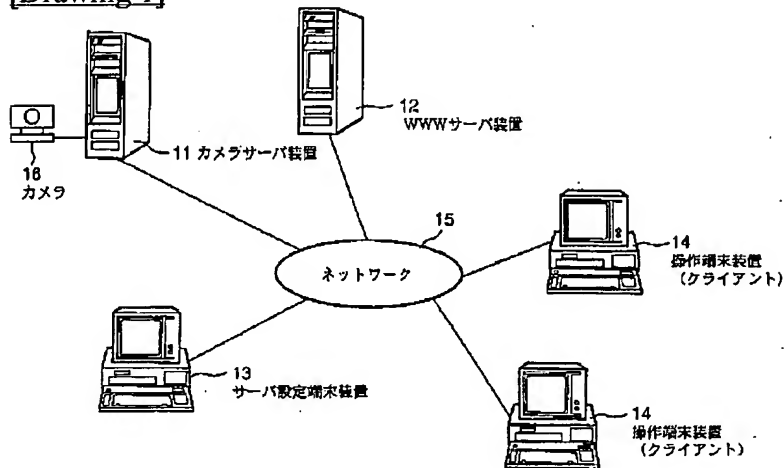
* NOTICES *

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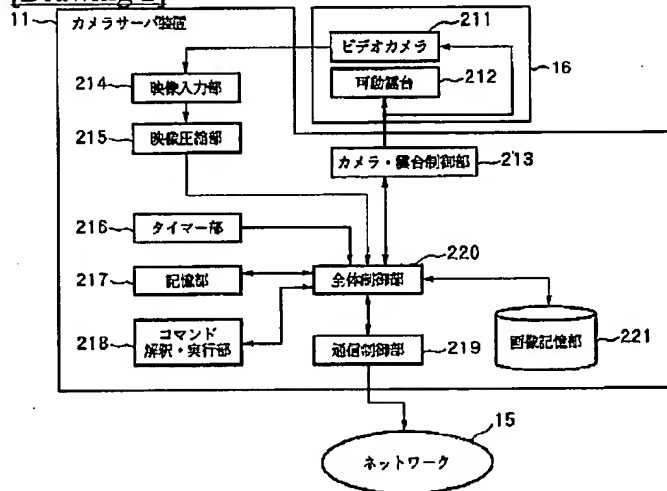
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2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

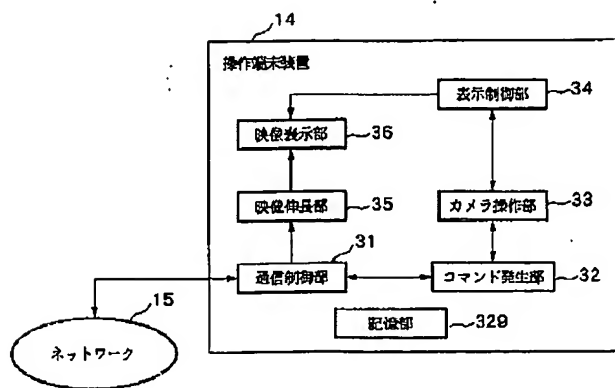
[Drawing 1]



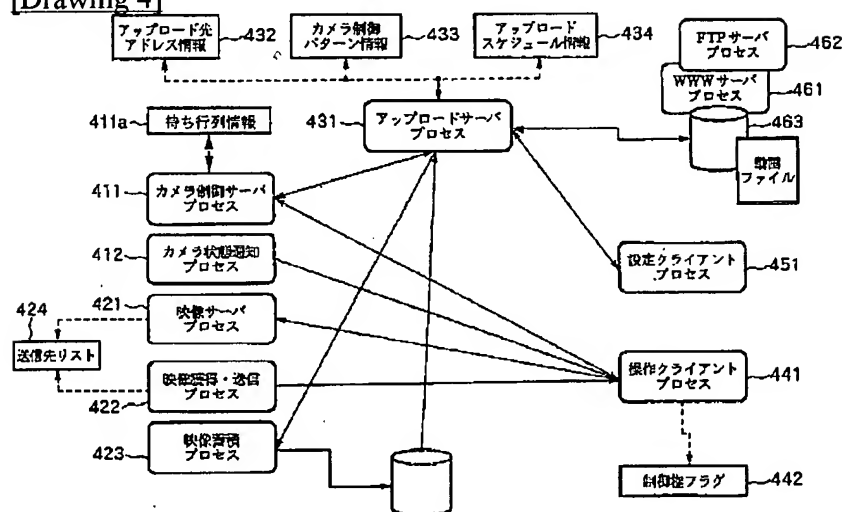
[Drawing 2]



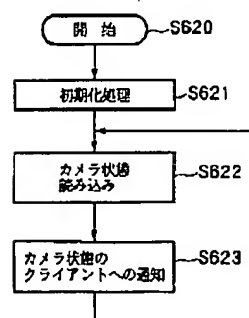
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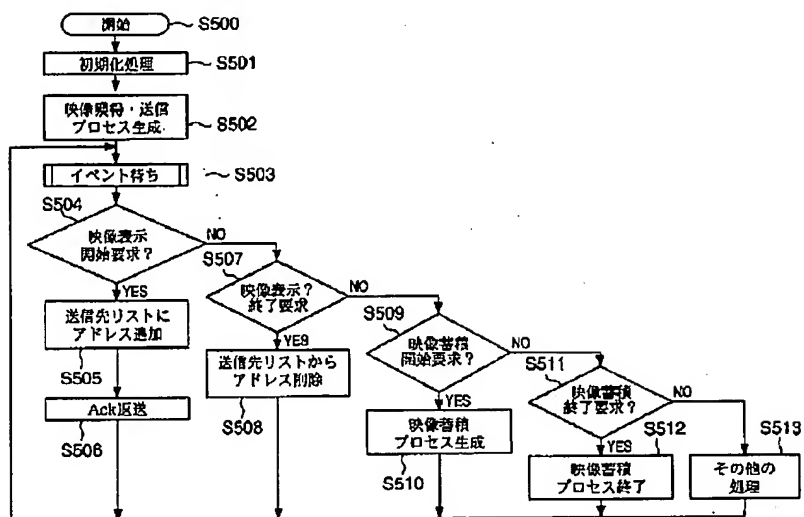
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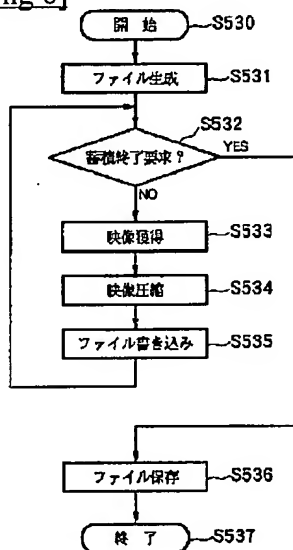
[Drawing 9]



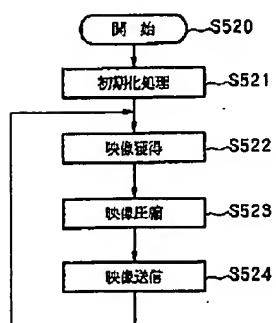
[Drawing 5]



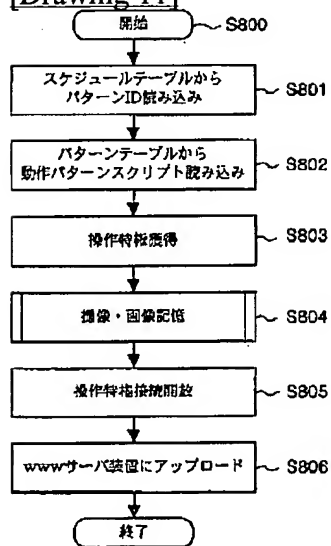
[Drawing 6]



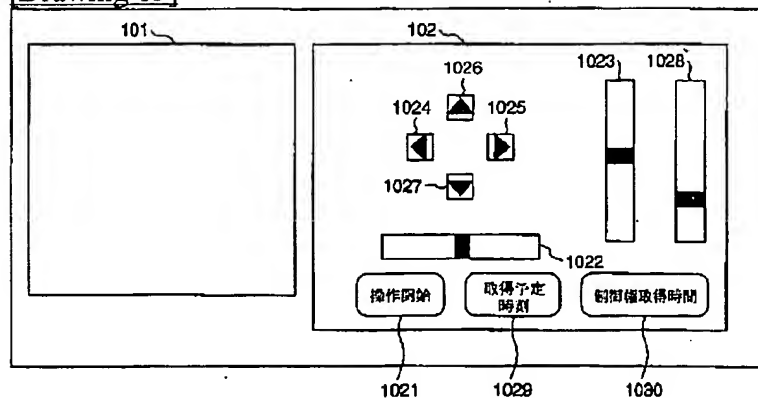
[Drawing 7]



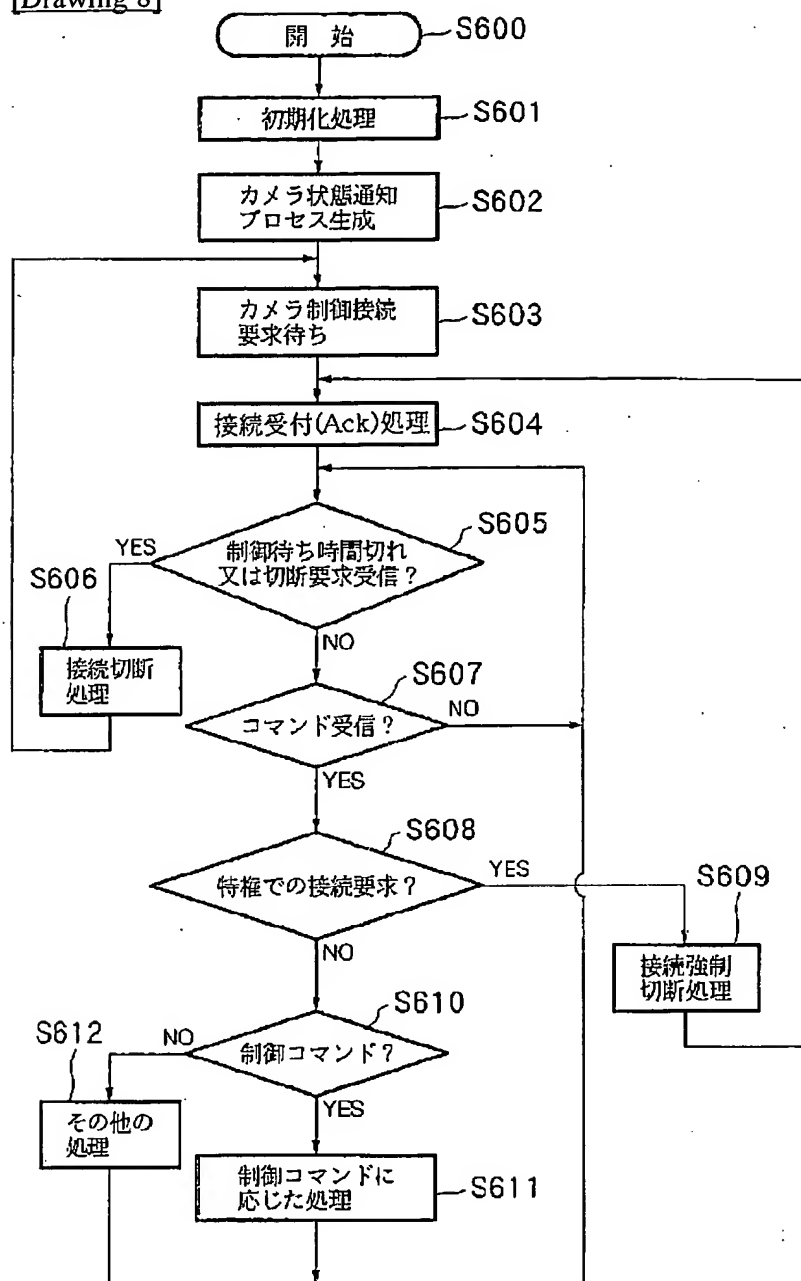
[Drawing 11]



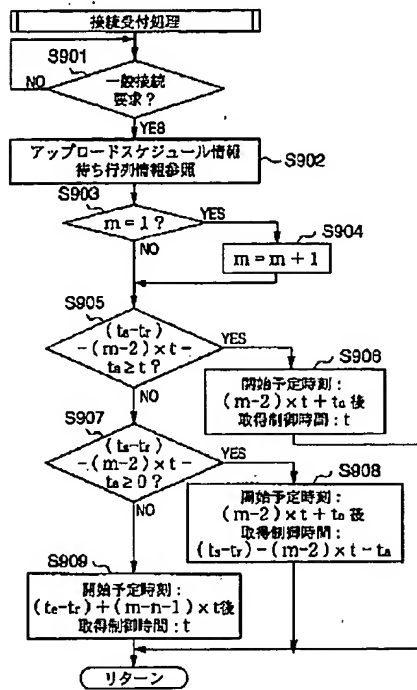
[Drawing 13]



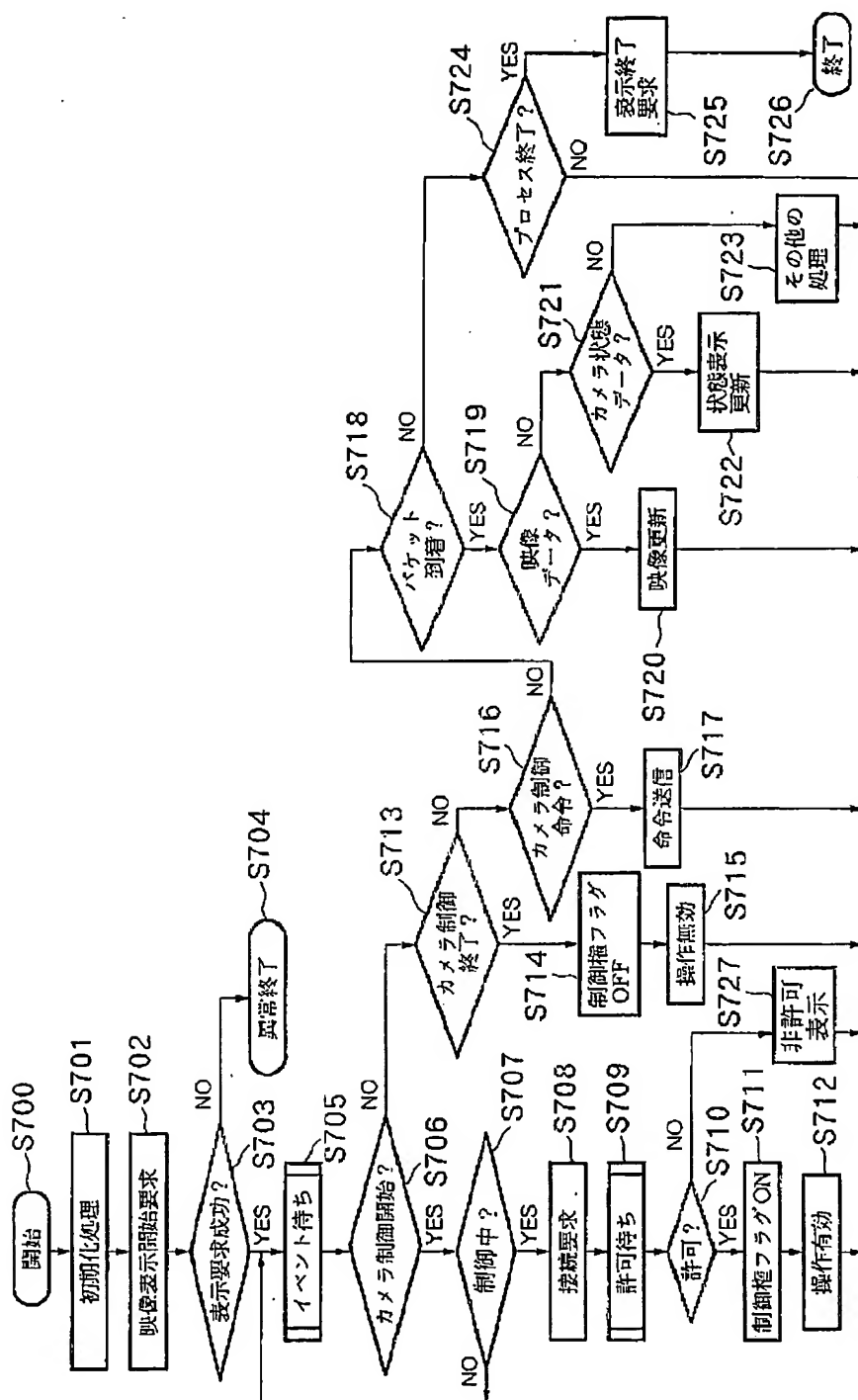
[Drawing 8]



[Drawing 15]



[Drawing 10]



[Drawing 12]

(1) カメラ制御接続要求	送信元アドレス	送信先アドレス	CON			
(2) カメラ制御接続切断要求	送信元アドレス	送信先アドレス	DIS			
(3) パン角位置変更要求	送信元アドレス	送信先アドレス	PAN	θ		
(4) テルト角位置変更要求	送信元アドレス	送信先アドレス	TLT	ϕ		
(5) ズーム倍率変更要求	送信元アドレス	送信先アドレス	ZOM	α		
(6) 映像表示開始要求	送信元アドレス	送信先アドレス	STR			
(7) 映像表示終了要求	送信元アドレス	送信先アドレス	STP			
(8) カメラ制御接続終了要求	送信元アドレス	送信先アドレス	DIS			
(9) カメラ状態通知	送信元アドレス	送信先アドレス	CAM	θ	ϕ	α
(10) 映像データ	送信元アドレス	送信先アドレス	Eq1	時刻		
			θ	ϕ	α	キャプチャ制限 圧縮映像データ
(11) 映像監視開始要求	送信元アドレス	送信先アドレス	MST	ファイル名		
(12) 映像監視終了要求	送信元アドレス	送信先アドレス	MSP	ファイル名		

[Drawing 14]

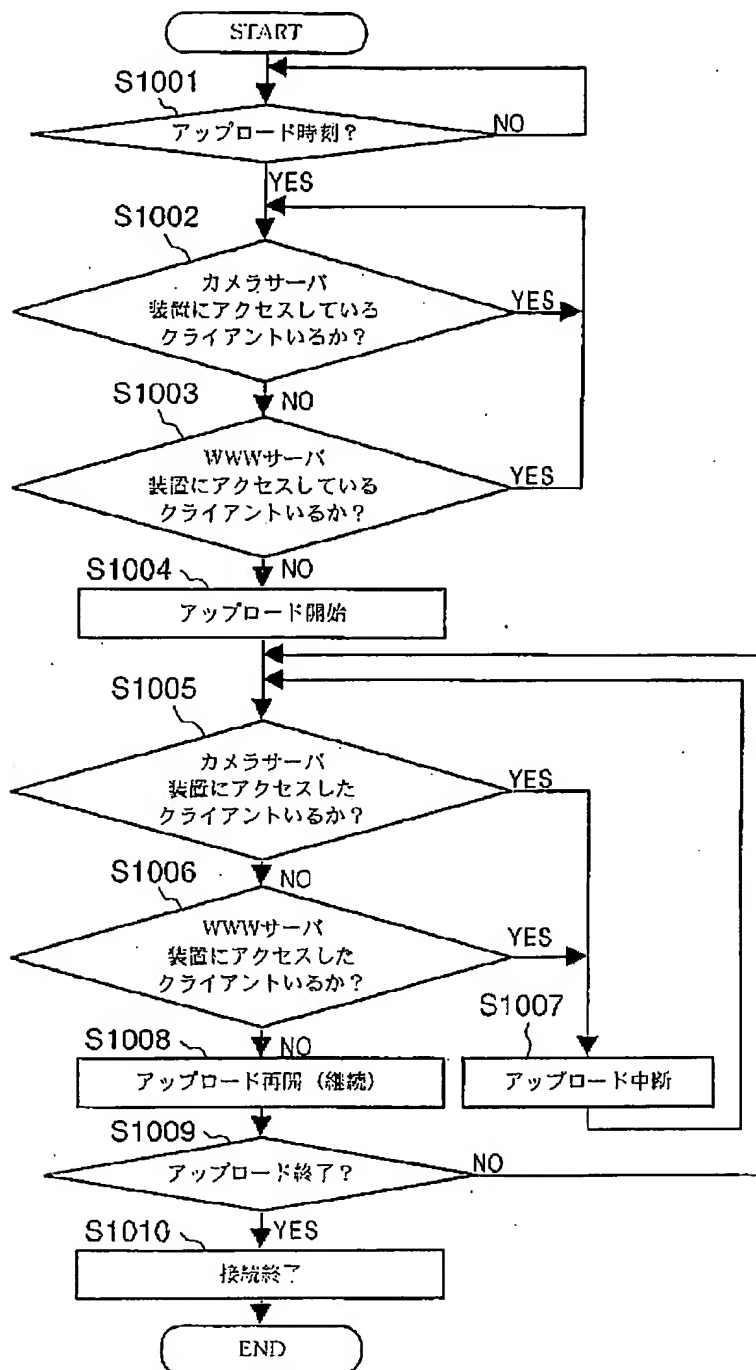
(1)

エントリ 番号	監視開始 時刻	監視終了 時刻	アップロード 時刻	パターンID	ファイル名
1	12:00	12:10	13:00	1	File 1
2	15:00	16:00	18:00	2	File 2
3	21:00	21:30	23:00	1	File 3

(2)

パターンID	動作パターンスクリプト
1	(20, 20, 1) 10 (30, 20, 2) 10 (-20, -20, 4) 20 *
2	(20, 20, 1) 60 (30, 20, 2) 60 (-20, -20, 4) 60 *
3	(0, 0, 1) 30 (40, 20, 2) 30 (-20, -20, 1)
4	(30, 20, 2)

[Drawing 16]



[Translation done.]